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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,058	08/01/2003	Nathan F. Gardner	LUM-02-10-01	6339

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EXAMINER	
FARAHANI, DANA	

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 03/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/633,058	GARDNER ET AL.	
	Examiner	Art Unit	
	Dana Farahani	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/1/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki (US Patent 5,365,536).

Regarding claims 1, 5, and 6, Seki discloses in figure 1, a III-nitride light emitting device comprising a first layer 12 of first conductivity type; a first layer 14 of second conductivity type; an active region 13, a tunnel junction 3, the tunnel junction comprising: a second layer 32 of first conductivity type having a dopant concentration greater than the first layer of first conductivity type; and a second layer 31 of second conductivity type having a dopant concentration greater than the first layer of second conductivity type; a third layer 22 of first conductivity type; a first contact 15 electrically connected to the first layer of first conductivity type; and a second contact 21 electrically connected to the third layer of first conductivity type; the active region is disposed between a layer of first conductivity type and a layer of second conductivity type; and the tunnel junction is disposed between the first layer of first conductivity type and the third layer of first conductivity type, as can be seen in the figure. Although Seki does not disclose the first and second contact material has a reflectivity to light emitted by the active region greater than 75%, it would have been obvious to one of ordinary skill in the

art to adjust the reflectivity of the contact materials to light emitted by the active region, and make the contacts with the same material in order to make the desired light characteristics emitted by the device. Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. *In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936* (Fed. Cir. 1990).

Regarding claims 2-4, Seki discloses the limitations in the claims, except for the specific dopings of the layers, as claimed. Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. *In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936* (Fed. Cir. 1990).

Regarding claims 7 and 8, see Seki, column 4, lines 42-45, wherein it is stated that a tunnel junction has a depth of 50 nm, or less.

3. Claims 9-19, 26-29, 36-44, and 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki as applied to claim 1 above, and further in view of Murata et al., hereinafter Murata (US Patent 4,732,621).

Regarding claims 9, 15, 18, 19, 26- 29, 36, 41, 44, and 46, Seki substantially discloses the claimed invention, as discussed above, except for a textured layer between the third layer and the second contact.

Murata discloses in figure 8, a photovoltaic device with a textured electrode layer 2, shown in the figure. Therefore, it would have been obvious to one of ordinary skill in the art to at the time of the invention to utilize a textured surface adjacent to the second contact of the Seki's structure in order to affect the characteristics of the emitted light therefrom.

Regarding claims 10-12, 14, 16, 17, 37, 38, 40, 42, 43, and 47-50, layer 3 shown in figure 8 of Murata is a semiconductor. Although, Murata does not explicitly disclose the percentage of the semiconductor material in the texture, or a specific refraction index, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the amount of the semiconductor material in between the gaps of the textured surface, since it has been held that discovering an optimum value of a result effective variable involves routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).*

Regarding claims 13 and 39, at the pocket at the most left had side of the textured layer is filed with air.

4. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki as applied to claim 1 above, and further in view of Yagi et al., hereinafter Yagi (US Patent 6,642,618).

Regarding claim 20, Seki discloses the limitations in the claims, except for a submount, wherein the contacts of the device are connected to the submount.

Yagi discloses in figure 4, a submount 108, wherein the contacts of the chip 102, shown in the figure, are connected to the submount. Therefore, it would have been obvious to one of ordinary skill in the art to at the time of the invention to use a submount in Seki's device in order to provide physical as well as connection support to the structure.

Regarding claim 21, see Yagi, figure 4, wherein a lens105 overlies the submount.

5. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seki in view of Yagi as applied to claim 21 above, and further in view of Herring et al., hereinafter Herring (US Patent 6,552,905).

Seki in view of Yagi discloses the limitations in the claims, except for a heat sink between the leads and the submount.

Herring discloses a heat sink assembly to be used in a device (see the abstract). Therefore, it would have been obvious to one of ordinary skill in the art to at the time of the invention to use a heat sink in combination with the device of Seki in view of Yagi in order to extract the unwanted heat generated during the operation of the device.

6. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seki as applied to claim 1 above, and further in view of Fischer et al., hereinafter Fischer (US Patent 6,309,953).

Seki discloses the limitations in the claims, except for the contacts being Aluminum.

Fischer discloses an LED wherein Aluminum contacts are applied to it (see column 2, lines 63-67, and column 3, lines 1-11). Therefore, it would have been obvious to one of ordinary skill in the art to at the time of the invention to use Aluminum for the contacts of the device of Seki, since it is well known in the art that Aluminum has good heat sinking properties, as well as excellent conductivity.

7. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki as applied to claim 1 above, and further in view of Fischer and further in view of Elliott et al., hereinafter Elliott (US Patent 6,593,657).

Seki discloses the limitations in the claims, except for a multilayer contact with Aluminum and a AlCu, AlSi, AlSiTi, or AlCuW layer.

Fischer teaches using an Aluminum contact, as discussed above, but does not teach a multilayer contact. Elliott teaches a contact plug 16 shown in figure 7, wherein AlCu material 19 is used in conjuncture with another layer 30 (see column 9, lines 9-36). Therefore, it would have been obvious to one of ordinary skill in the art to at the time of the invention to use a multilayer contact with Aluminum and AlCu contact in order to have a better conductivity in the contact layers.

8. Claims 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki in view of Murata as applied to claim 26 above, and further in view of Boyd et al., hereinafter Boyd (US Patent 6,449,439).

Seki in view of Murata discloses the limitations in the claims, as discussed above, except for a polarization selection layer.

Boyd discloses in figure 2, a wire grid polarizer 206 used in a photographic device shown in the figure. Therefore, it would have been obvious to one of ordinary skill in the art to at the time of the invention to use a wirer grid polarizer in the device of Seki in view of Murata in order to affect the characteristics of the light emitting device.

9. Claims 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki in view of Murata as applied to claim 26 above, and further in view of Yagi.

Regarding claim 33, Seki in view of Murata discloses the limitations in the claims, as discussed above, except for a submount.

Yagi discloses in figure 4, a submount 108, wherein the contacts of the chip 102, shown in the figure, are connected to the submount. Therefore, it would have been obvious to one of ordinary skill in the art to at the time of the invention to use a submount in Seki's device in order to provide physical as well as connection support to the structure.

Regarding claim 34, see Yagi, figure 4, wherein a lens105 overlies the submount.

10. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seki in view of Murata and Yagi as applied to claim 34 above, and further in view of Herring.

Seki in view of Murata and Yagi discloses the limitations in the claims, except for a heat sink between the leads and the submount.

Herring discloses a heat sink assembly to be used in a device (see the abstract). Therefore, it would have been obvious to one of ordinary skill in the art to at the time of the invention to use a heat sink in combination with the device of Seki in view of Yagi in order to extract the unwanted heat generated during the operation of the device.

11. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seki in view of Murata as applied to claim 44 above, and further in view of Taskar et al., hereinafter Taskar (US Patent 5,990,531).

Seki in view of Murata discloses the limitations in the claims, as discussed above, except for an SiC substrate.

Taskar discloses at column 3, lines 7-10, that SiC substrates offer advantages such as good thermal conductivity. Therefore, it would have been obvious to one of ordinary skill in the art to at the time of the invention to use a SiC substrate in the device of Seki in view of Murata in order to benefit from the advantages that these substrate offer, such as high thermal conductivity.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (571)272-1706. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M Fahmy can be reached on (571)272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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